Algorithms and Complexity

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Algorithms – An Introduction

- What is an algorithm? What is an algorithm based upon?
- Some Examples of Algorithms.
- What is a pseudocode?

Characteristics of an algorithm

- Input and Output
- Precision
- Determinism
- Finiteness
- Affirmation

Complexity and Asymptotic Notations

- What is complexity?
- Types of complexity – space and time complexities

The following are asymptotic notations.

- Big O notation
- Big Omega (Ω) notation
- Big Theta (Θ) notation

We can have, in general, the following methods to measure complexity.

- Better case measures (empirical)
- Average case measures
- Worst case measures

Some examples of complexity

- Constant [$O(1)$]
- Linear [$O(n)$]
- Quadratic [$O(n^2)$]
- Logarithmic [$O(\log n)$]
- Loglinear [$O(n \log n)$]
- Polynomial [$O(n^p)$], where, $p \epsilon \mathbb{Z}^+$
- Factorial [$O(n!)$]
- Exponential [$O(2^n)$]

The classes of problems

- What is a decision problem?

The following are the types (classes) of decision problems.

- P – type
- NP – type

ANY QUESTIONS?

Selected References (not listed in Standard format)*

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